

A6 GMC

**Fogstyrningsutrustning
Joint tracking equipment
Schweissfugen-Abtastgerät
Equipement de suivi de joint**

**Bruksanvisning och reservdelsförteckning
Instruction manual and spare parts list
Betriebsanweisung und Ersatzteilverzeichnis
Manuel d'instructions et liste de pièces détachées**

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Dep. ADD
Technical
Documentation
ESAB, Laxå S

UNDERHÅLL

Kontrollera dagligen att styrfingrarna inte är slitna eller skadade. Rengör regelbundet Fogstyrningsenheten PAF 9 med tryckluft. A6 GMC kan levereras med olika typer av slider. Följ anvisningarna för respektive typ. Trimning av systemet beskrivs under rubriken "Installation".

Beställning av reservdelar

Reservdelar kan beställas genom Er närmaste ESAB representant, se sista sidan. Vid beställning, uppge typ av utrustning (A6 GMC), tillverkningsnummer samt benämning och artikelnummer enligt reservdelsförteckningen.

TECHNICAL DESCRIPTION

The A6 GMC joint-tracking equipment is used for positioning and joint-tracking of automatic welding machines in both fillet joints and various kinds of butt joint. The equipment has been adapted to ESAB standard slides and can control either one servo-motor or two simultaneously.

TECHNICAL DATA

PAG 9 control equipment

Mains voltage	42 VAC 50-60 Hz
Power	1200 VA
Motor regulator type	Thyristor regulator
Signal-converted regulating voltage	
guide finger	0-23 VDC
Stator voltage, joystick control	27 VDC
Field voltage, separately excited motor	48 VDC
Enclosure type	IP 53
Max. ambient temperature	+ 45°C
Weight	17 kg

GMC guide finger

Sensitivity, deviation in the joint	± 0.1 mm
Working range, radially 360°	4 mm
Slide blocking position, vertically downwards	adjustable 0.4 mm
Weight	0.6 kg

For working range and setting speed, see Fig. 1. For the A6 servo slide, see instruction manual no. 334 346-001.

Angular deviation of the weld joint α °

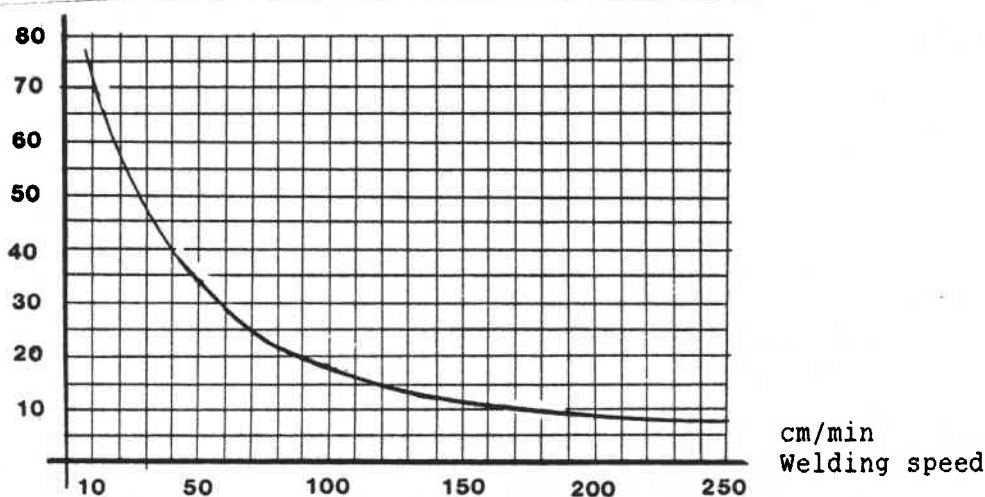


Fig. 1 Diagram of the maximum angular deviation of the weld joint in relation to the preset welding speed.

The A6 GMC comprises:

PAG 9 control equipment
GMC guide finger
Guide finger attachment to contact tube
Connection cable, guide finger - PAG 9 L = 2 m

ESAB standard servo slides for A6 GMC

A6 servo slide of ball-bushing type with permanently excited
42 V DC motor
A6 motorized slide, long runner with sliding support and
A6 VEC motor 42 V - 4000 rpm - ratio 74:1

Extra equipment for A6 GMC

Intermediary transformer for separate voltage supply, from
mains voltage 190, 220, 380, 415, 440, 500 V 50 Hz
200, 230, 380, 415, 440, 500 V 60 Hz

Cable 2 x 2.5 mm², connection PAG9
Cable 3 x 2.5 mm², connection transformer

Ordering no.

156 099-881
156 104-880
156 437-880
146 215-883

see 334 333

see 334 426

148 636-002

2626 134-02
2626 134-04

Controls and connections

Front panel

Switch
ON/OFF

Switch
for selection of operating mode
Manual or automatic control of one or both slides

Joystick
for manual control of the cross slide (will take command
irrespective of setting of AI 14)

Pushbutton
for automatic travel to guide finger home position in the
joint (e.g. when the finger passes out over the edge of
the workpiece)

Indicating lamp (red)
shows that the guide finger is off its working range
(slide blocking position)

Item nos. as
per Fig.2
and Fig.x

AI 15

AI 14

AI 11

AI 13

AI 12

Rear panel

Sleeve socket, 7-pole
for connection of guide finger

Sleeve socket, 5-pole
for connection of vertical slide motor

Sleeve socket, 5-pole
for connection of horizontal slide motor

Switch
for reversing direction of rotation of horizontal slide motor

Control fuses, 10 A slow-blow (2 pcs)

Frame

Supply unit (PCB)
stabilizes the supply voltage

Thyristor regulator (PCB)
controls the slide motors

Amplifier (PCB)
regulates and stabilizes motor motions

Preamplifier (PCB)
amplifies the signals from the photo-transistors of the servo
control unit

Control transformer
primary connection 42 V, 50-60 Hz

Rectifier and transient protection
rectifies the 48 V field voltage for the separately excited
motor (A6 VEC)

Terminal strip, 2-pole for 42 V connection voltage

AI 16

AI 17

AI 18

AI 19

AI 20

AI 1

AI 2

AI 3

AI 23

AI 24, AI 25

AI 26

Arrangement of components

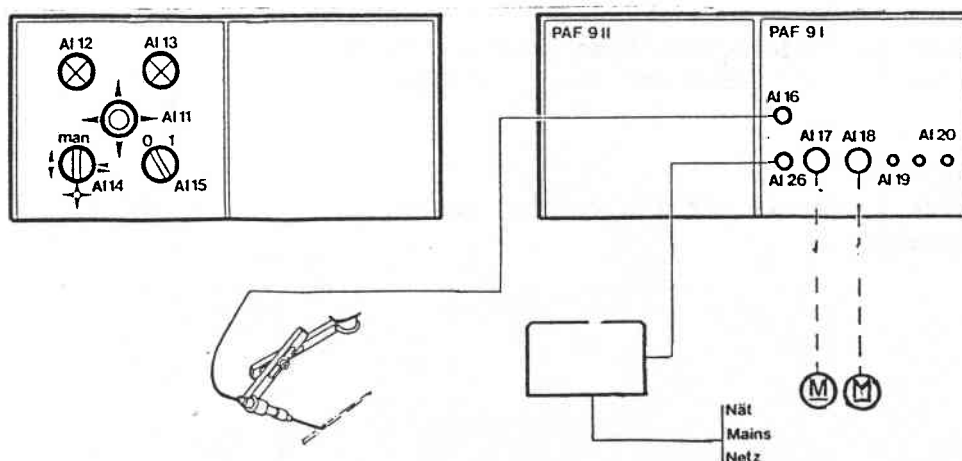


Fig. 2

INSTALLATION

- 1 For measurements, see the dimension drawing Fig. 3 and the instruction manuals for the various servo slides.
- 2 For connection, see Fig. 6 and the connection instructions, Fig. 7. Check that necessary power and voltage for complete installation are available.
 - When using a power source of one of the types LAE 800 - 1000 - 1250 - 1600, connected for 42 V control voltage, the necessary power can be obtained from the standard automatic welding machine - see terminal PEG.
 - When suitable voltage is unavailable or when an LAH 500-630 42 V power source is used, there must always be installed a 42 V intermediary transformer for the voltage supply to the A6 GMC (see "Accessories" section).
- 3 For controls, see PAF9, Fig. 2.

TRIMMING OF THE JOINT-TRACKING EQUIPMENT

The joint-tracking equipment should be trimmed on installation and, if necessary, in connection with replacement of vital parts, e.g. guide finger, or when changing type of servo slide.

The trimming potentiometers are to be found on the AI 4 amplifier board in the PAF9 joint-tracking unit and they provide two trimming possibilities:

- 1 GAIN that determines the pre-amplification, i.e. the accuracy of the slide motion.
- 2 EMERG that determines the slide blocking position, i.e. the guide finger downwards position in the vertical when slide motions are blocked and the guide finger is inoperative (emergency position). The blocking is indicated by the lighting of the red lamp (AI 12) on the PAG 9 control panel.

Joint-tracking accuracy

Tested with potentiometer EMERG in the max. position.

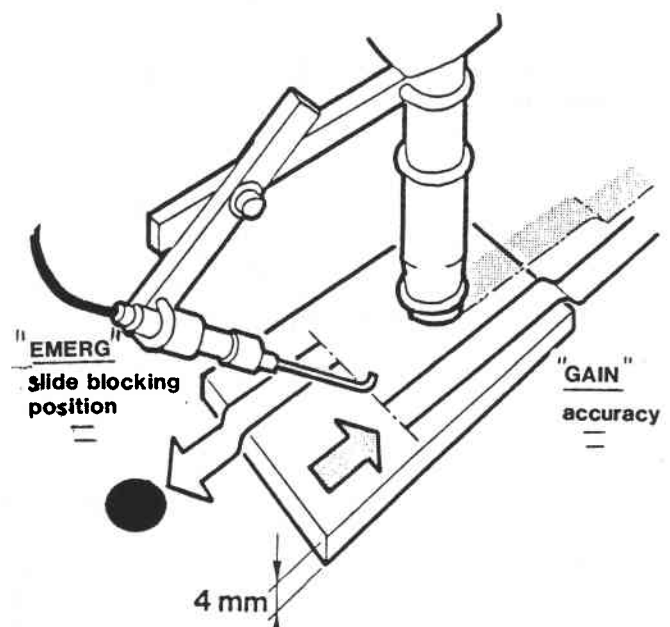
Required accuracy can be trimmed by way of potentiometer "GAIN". Turning it to the right will increase amplification of the signal from the guide finger, and turning it to the left will reduce this amplification.

Vertically upwards:

Push the plate in position under the guide finger (Fig. 4) and watch the slide moving vertically towards its new position. Trimming is correct when the slide adjusts rapidly and without oscillation.

Vertically downwards:

Use the same procedure as for the upwards motion in the vertical but start with the plate in position under the guide finger. Then pull the plate away.



Horizontally in both directions:

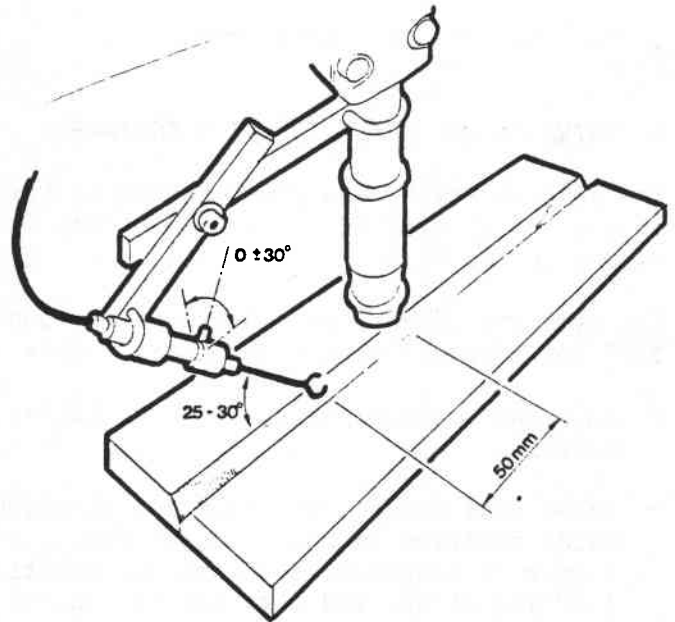
Move the guide finger to the maximum in one direction and observe the adjusting procedure (e.g. by means of a plate as per above). Carry out the same test in the other direction. Finally trim the potentiometer "EMERG" so that the slide blocking function is actuated in the desired guide finger arm position.

OPERATION

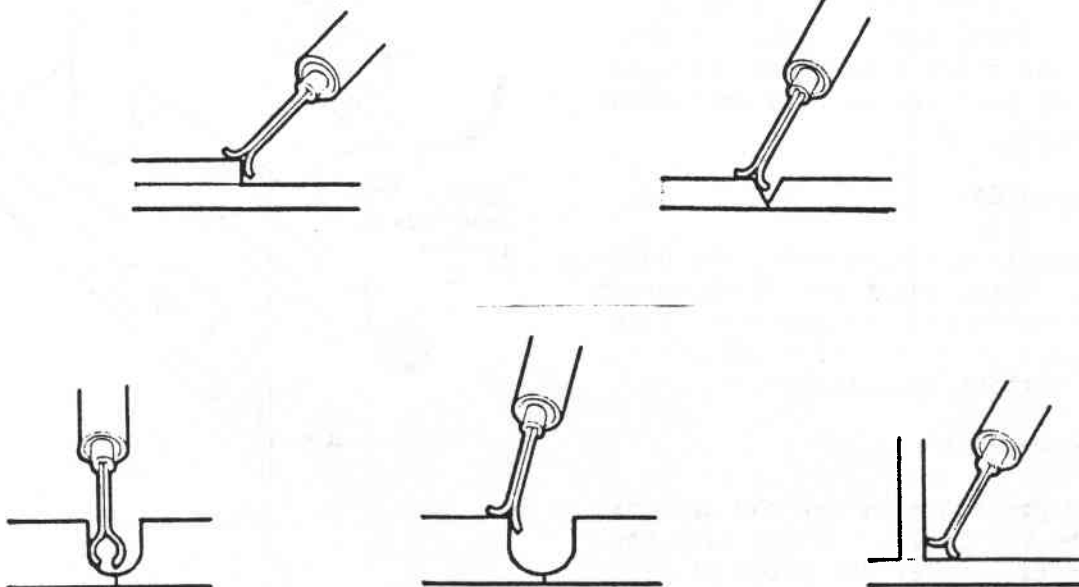
Setting of guide finger and welding nozzle in the joint

- 1 The guide finger holder should be mounted flush with the contact device approx. 50 mm ahead of the welding nozzle and trailing against the work-piece at an angle of $25-30^\circ$. For an optimum position against the guiding edge the guide finger can be rotated on its mount, though max. $\pm 30^\circ$ in relation to the contact device and with the guide pin pointing up. If wrongly mounted the servo slides may work uncontrollably and in the wrong direction. The direction of rotation of the horizontal slide motor can be reversed by means of switch AI 19.

The contact device can be precision-set within ± 20 mm in the joint by way of two set screws on the control unit. Turning the set screws will offset the guide finger in relation to its home position. This will be immediately compensated by the servo slides and the guide finger can be set to the desired position in the joint.



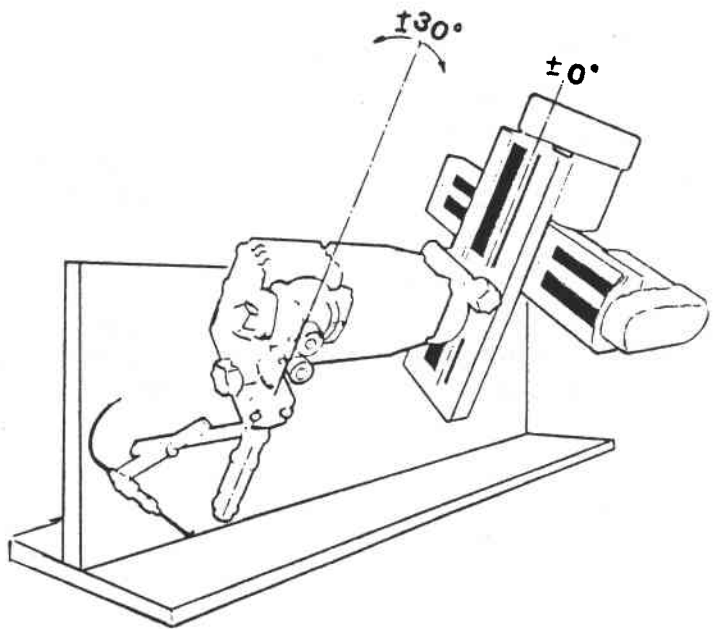
Examples of some different types of joint and of the guide finger angle against the guiding edges.



- 2 When welding vertical fillet joints the contact device angle against the weld joint and the vertically mounted slide must be considered. Should the angle against the vertically mounted slide be 30° the cross slide should be rotated in relation to the workpiece:

The normal angle for submerged-arc welding in relation to the vertical plate in a vertical fillet joint is 30° , which means that the cross slide generally can be retained in its normal position.

A greater angle against the vertical plate is normally required for MIG/MAG welding and in such a case it may be necessary to rotate the cross slide along with the contact device to obtain the correct angle.

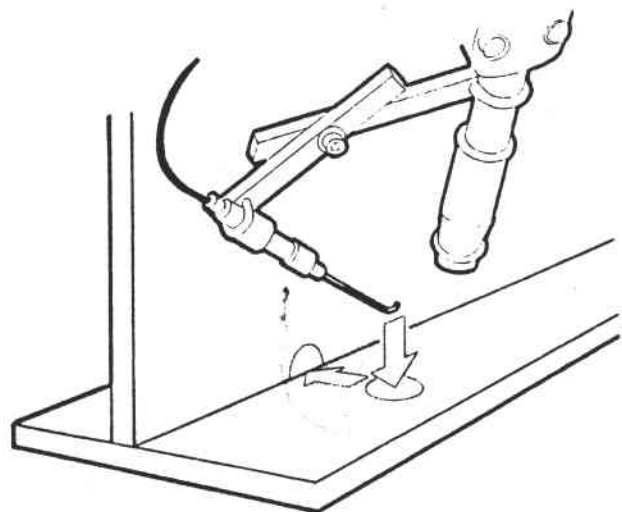


Positioning prior to start-up of welding

- 1 Position the welding equipment so in relation to the weld joint that the working range of the cross slide covers the entire height of the joint, as well as the deviation in the lateral from the starting point to the end point.
- 2 Set switch AI 14 to position "MAN" and move the tip of the guide finger, by way of the joystick, so that it slightly touches the guiding edge and the red slide blocking lamp goes out.
- 3 Set switch AI 14 to position "AUT". The guide finger will now search for its home position and consequently also for the preset position of the welding nozzle in the joint. Adjust this position as necessary by means of the two set screws on the control unit.

AUTOMATIC TRACKING OF THE STARTING POINT

Position the welding nozzle coarsely 10-20 mm off the joint. With switch AI 14 in position "AUT" press pushbutton AI 13 and keep it pressed. The equipment will now primarily search for the correct position in the vertical to make the slide blocking lamp go out, and then the correct position in the horizontal until such time as the guide finger has adjusted to the home position and the preset position in the joint.



- 4 The welding equipment is in position for start-up.

MAINTENANCE

Check daily that the guide fingers are not worn or damaged. Regularly clean the PAF9 joint-tracking unit with compressed air. The A6 GMC can be delivered with various types of slides. Follow the instructions for the type in question. Trimming of the system is described under "Installation".

Ordering of spare parts

Spare parts can be ordered through your nearest ESAB representative - see last page. When ordering, please state type of equipment (A6 GMC), serial number, denomination and ordering number in accordance with the spare parts list.

**MÄTTSKISS
DIMENSION DRAWING
MASSBILD
COTES D'ENCOMBREMENT**

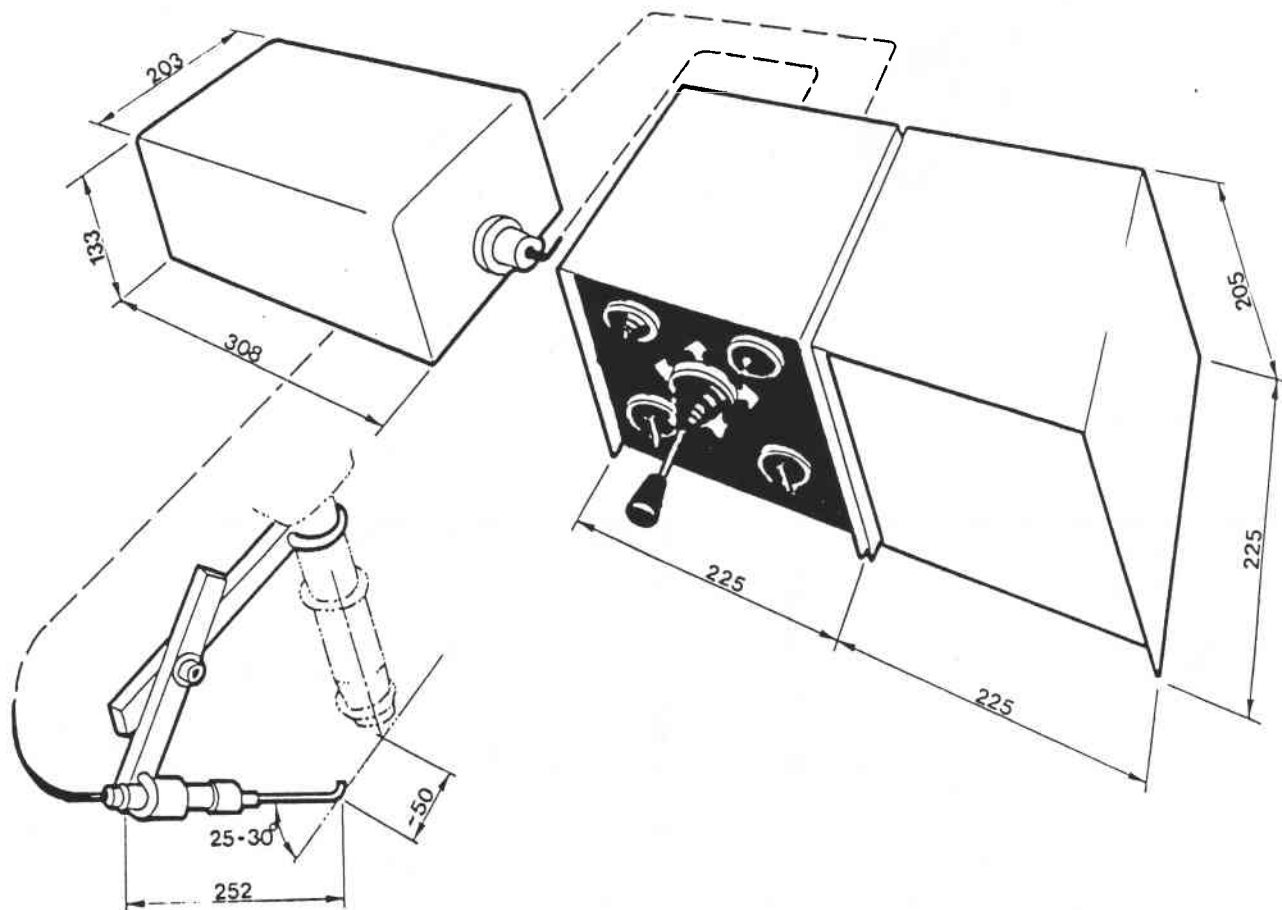


Fig 5

INKOPPLINGSANVISNINGAR
 CONNECTION DRAWING
 EINSCHALTANWEISUNG
 SCHEMA DE CONNEXION

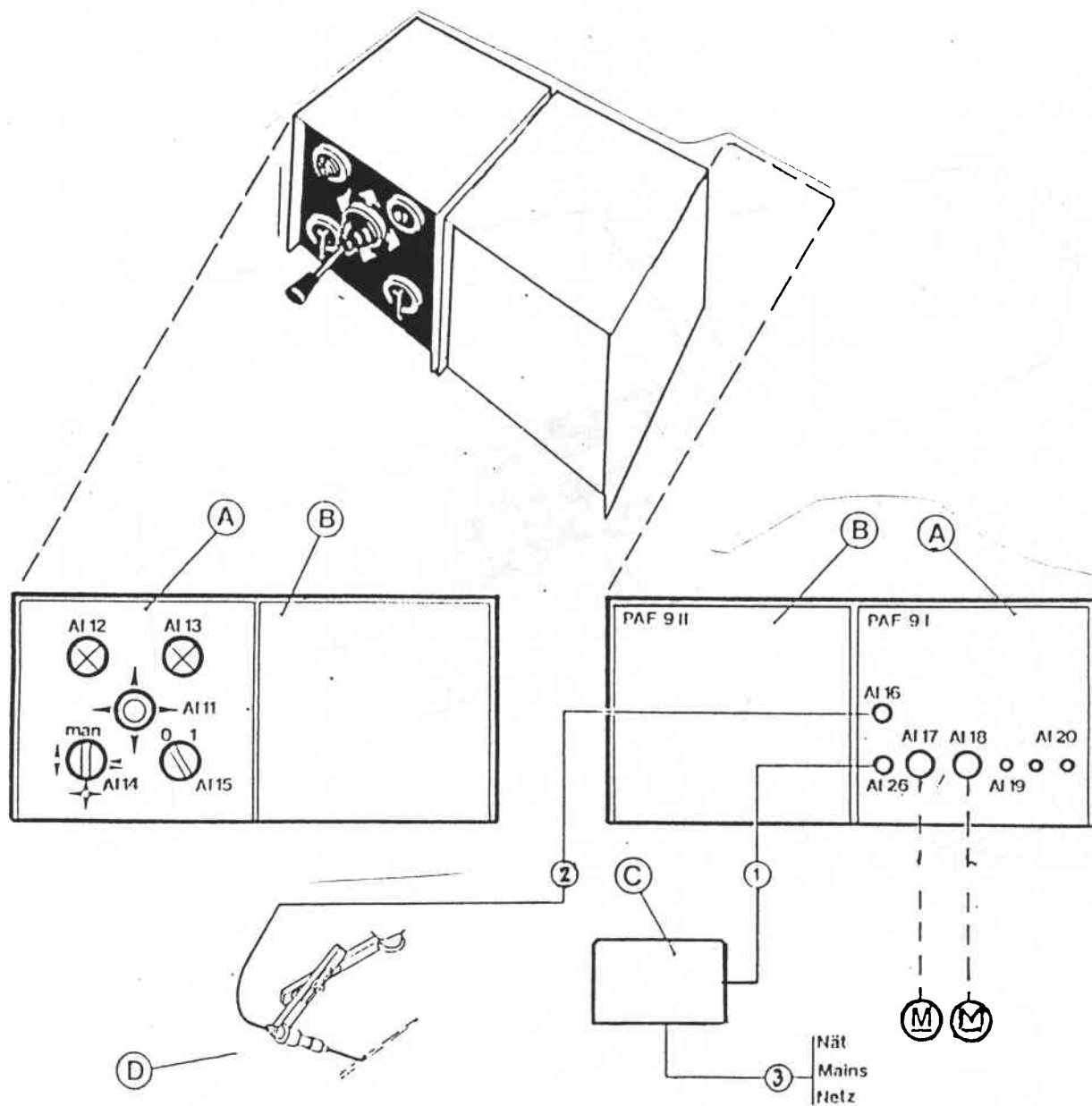


Fig 6

	Benämning	Denomination	Bezeichnung	Désignation
A	PAF 9 I	PAF 9 I	PAF 9 I	PAF 9 I
B	PAF 9 II	PAF 9 II	PAF 9 II	PAF 9 II
C	Anpassningstransformator	Matching transformer	Anpasstrafo	Transformateur d'adaptation
D	Servostyrdon	Servo control unit	Hilfssteuereinheit	Unité servocommande
1	Kabel 2x1,5 mm ²	Cable 2x1.5 mm ²	Leitung 2x1,5 mm ²	Câble 2x1,5 mm ²
2	Kabel 7x0,75 mm ²	Cable 7x0.75 mm ²	Leitung 7x0,75 mm ²	Câble 7x0,75 mm ²
3	Nätkabel 3x1,5 mm ²	Mains cable 3x1.5 mm ²	Netzleitung 3x1,5 mm ²	Câble d'alimentation 3x1,5 mm ²
AI 11	Elkopplare	Switch	Schalter	Interrupteur
AI 12	Signallampa	Indicating lamp	Meldeleuchte	Lampe témoin
AI 13	Tryckknapp	Pushbutton	Drucktaste	Bouton-poussoir
AI 14	Elkopplare	Switch	Schalter	Interrupteur
AI 15	Elkopplare	Switch	Schalter	Interrupteur
AI 16	Uttag (servostyrdon)	Socket (servo control unit)	Steckdose (Hilfssteuereinheit)	Prise (unité servocommande)
AI 17	Uttag (vertikalslid)	Socket (vertical slide)	Steckdose (Vertikal-Schlitten)	Prise (glissière verticale)
AI 18	Uttag (horizontalslid)	Socket (horizontal slide)	Steckdose (Horizontal-Schlitten)	Prise (glissière horizontale)
AI 19	Elkopplare	Switch	Schalter	Interrupteur
AI 20	Säkring	Fuse	Sicherung	Fusible

SCHEMA
DIAGRAM
SCHALTPLAN
SCHEMA

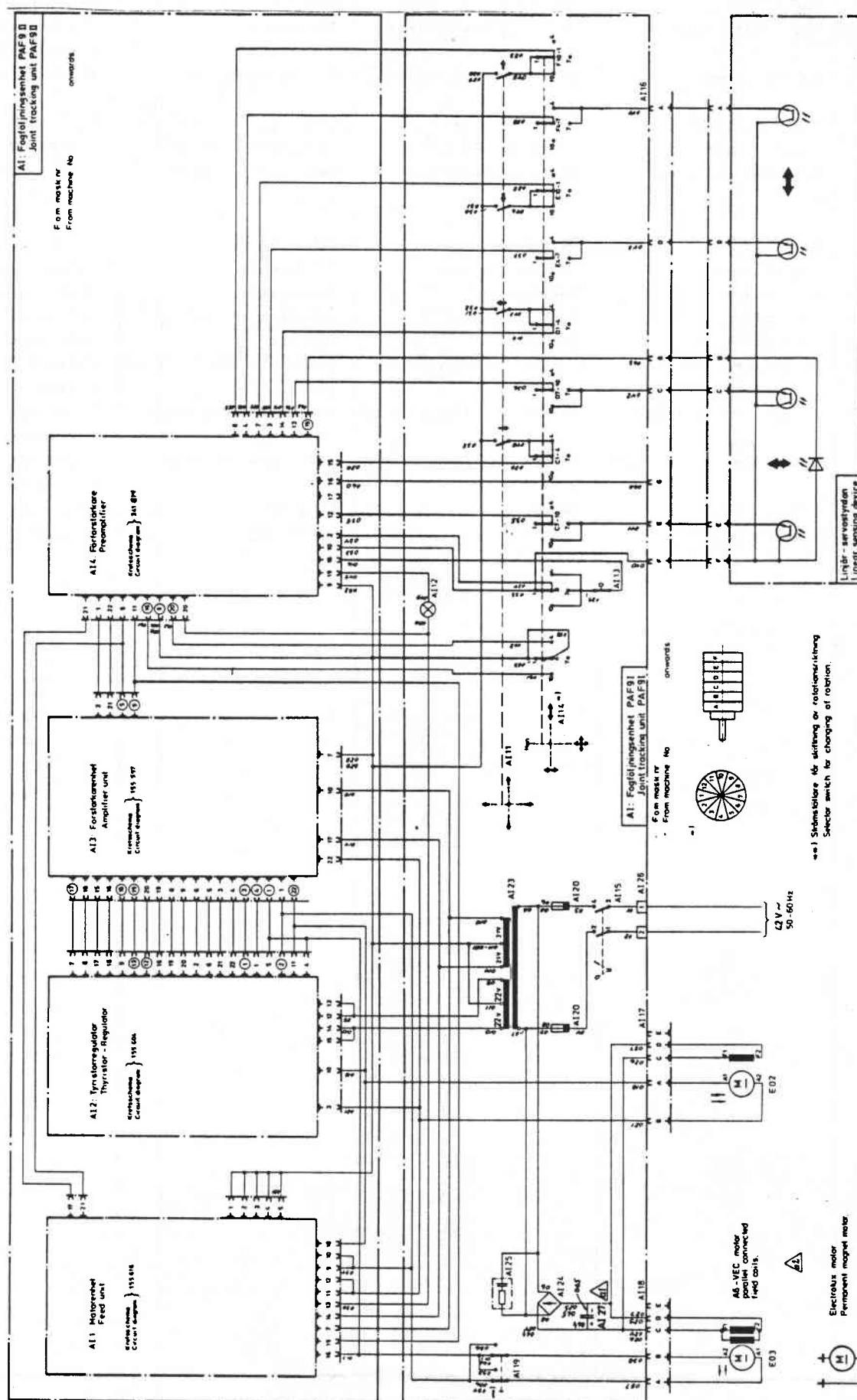


Fig 7

	Benämning	Denomination	Bezeichnung	Désignation
AI 1	Kretskort (matarenhet)	PCB (supply unit)	Leiterplatte (Versorgungseinheit)	Circuit imprimé (groupe d'alimentation)
AI 2	Kretskort (thyristor- regulator)	PCB (thyristor regulator)	Leiterplatte (Thyristor- Regulator)	Circuit imprimé (régulateur thyristorisé)
AI 3	Kretskort (förstärkare)	PCB (amplifier)	Leiterplatte (Ver- stärker)	Circuit imprimé (amplificateur)
AI 4	Kretskort (för- förstärkare)	PCB (Pre-amplifier)	Leiterplatte (Vor- verstärker)	Circuit imprimé (pré- amplificateur)
AI 11	Elkopplare (manipulator)	Switch (positioner)	Schalter (Positionier- Vorrichtung)	Interrupteur (positionneur)
AI 12	Signallampa	Indicating lamp	Meldeleuchte	Lampe témoin
AI 13	Tryckknapp	Pushbutton	Drucktaste	Bouton-poussoir
AI 14	Elkopplare	Switch	Schalter	Interrupteur
AI 15	Elkopplare	Switch	Schalter	Interrupteur
AI 16	Uttag (servostyrdon)	Socket (servo control unit)	Steckdose (Hilfssteuer- einheit)	Prise (unité servocommande)
AI 17	Uttag (vertikal slid)	Socket (vertical slide)	Steckdose (Vertikal- Schlitten)	Prise (glissière verticale)
AI 18	Uttag (horisontal slid)	Socket (horizontal slide)	Steckdose (Horizontal- Schlitten)	Prise (glissière horizontale)
AI 19	Elkopplare	Switch	Schalter	Interrupteur
AI 20	Säkring	Fuse	Sicherung	Fusible
AI 23	Transformator	Transformer	Trafo	Transformateur
AI 24	Likriktare	Rectifier	Gleichrichter	Redresseur
AI 25	Störskydd	Interference suppressor	Störschutz	Suppresseur
AI 26	Plint	Connection block	Klemmleiste	Plaque à bornes

Reservdelsförteckning Spare parts list Ersatzteilverzeichnis Liste de pièces détachées

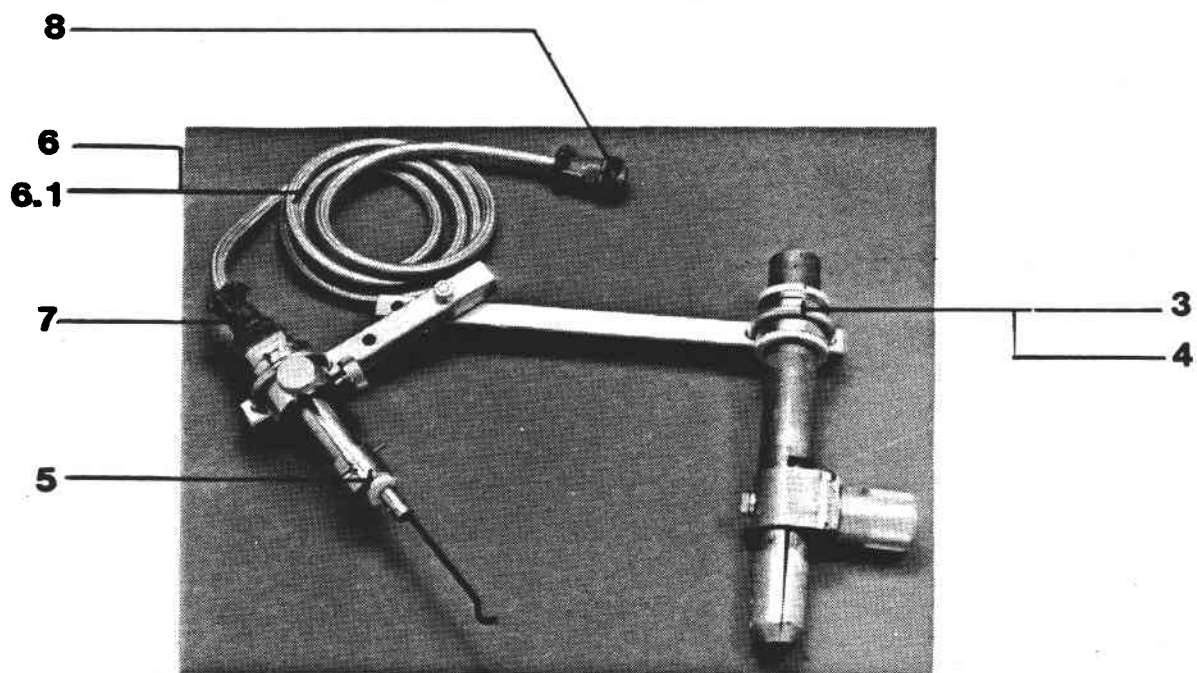
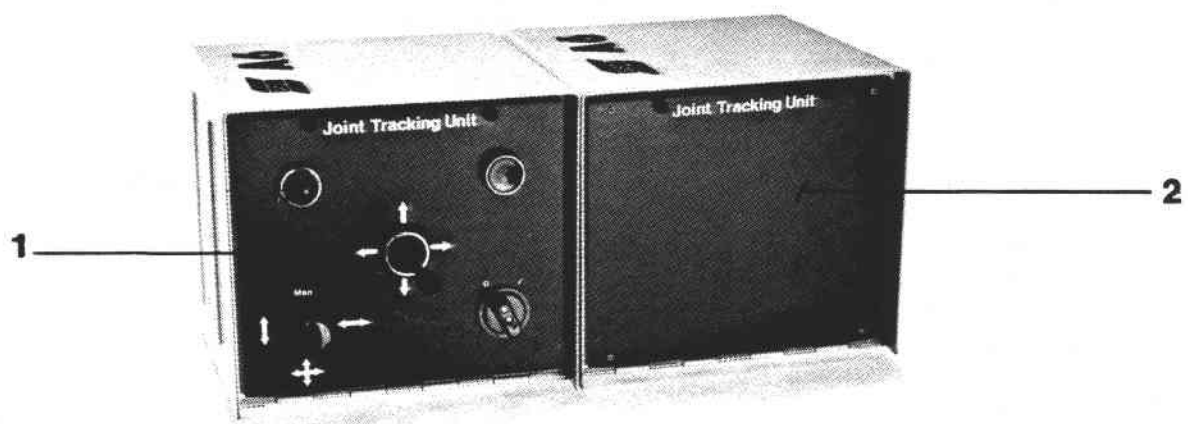
Reservdelar beställs genom närmaste ESAB-representant, se sista sidan. Vid beställning v. v. uppge typ och tillverkningsnummer samt benämningar och beställningsnummer enl. reservdelsförteckningen.

Spare parts are to be ordered through the nearest ESAB agency as per the list on the back of the cover. Kindly indicate type of unit, serial number, denominations, and ordering numbers acc. to the spare parts list.

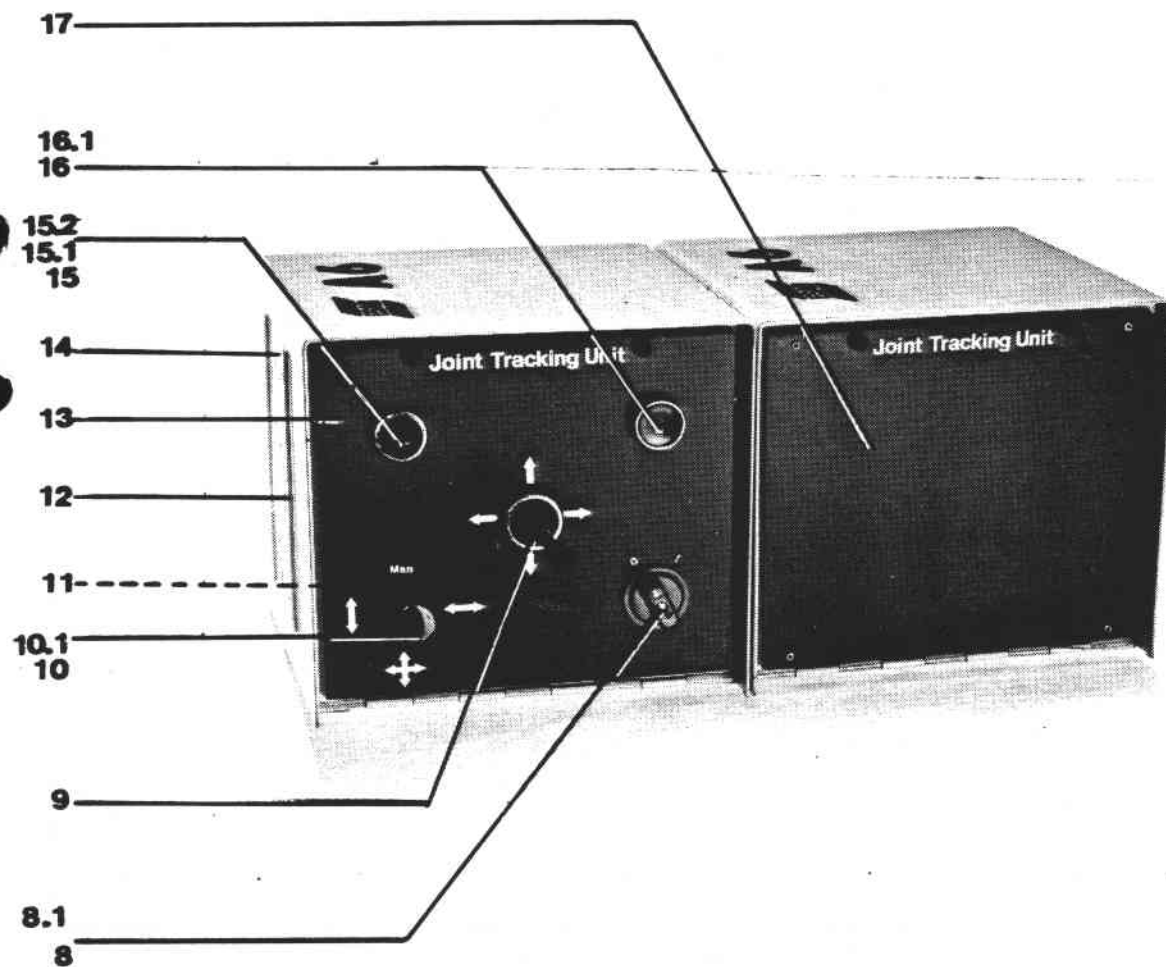
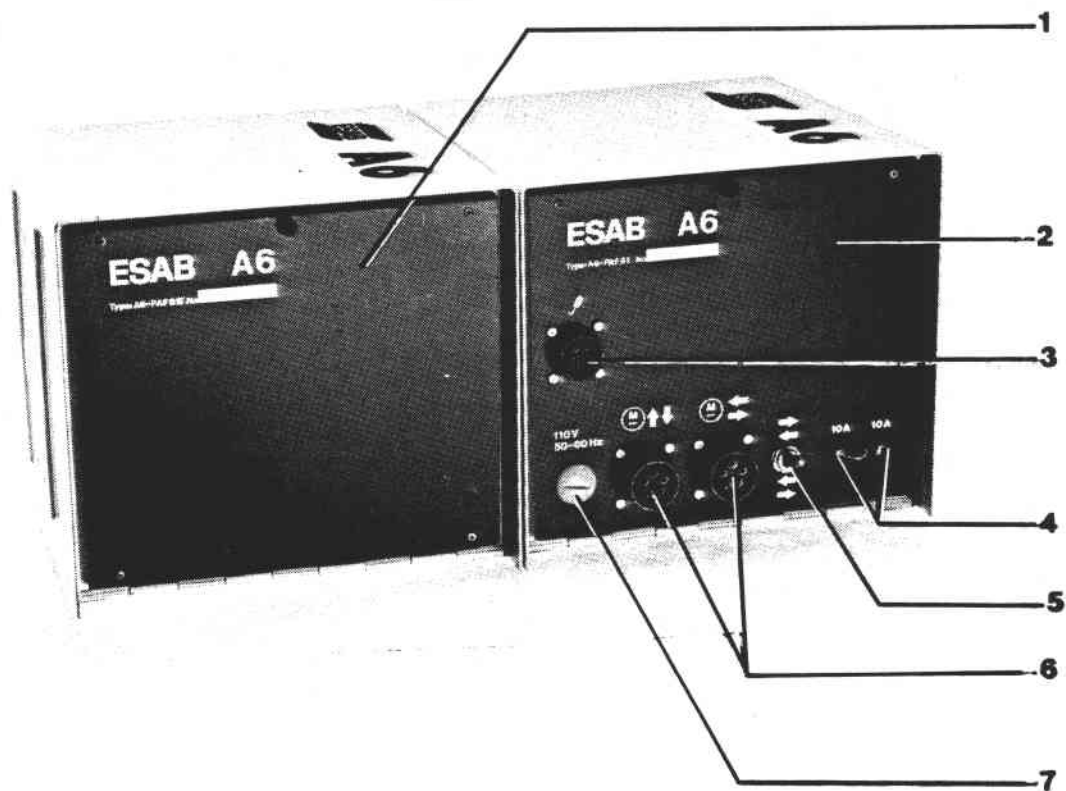
Die Ersatzteile können bei der nächsten ESAB-Vertretung bestellt werden, siehe letzte Seite. Bitte geben Sie Typenbezeichnung und Herstellnummer sowie Bezeichnungen und Bestellnummern lt. Ersatzteilverzeichnis an.

Au dos de la brochure, vous trouverez l'adresse du représentant ESAB le plus proche. Prière de lui adresser votre commande, après avoir pris le soin de mentionner le type et le numéro de série de l'unité ainsi que le numéro de commande et la désignation conformément à la liste de pièces détachées.

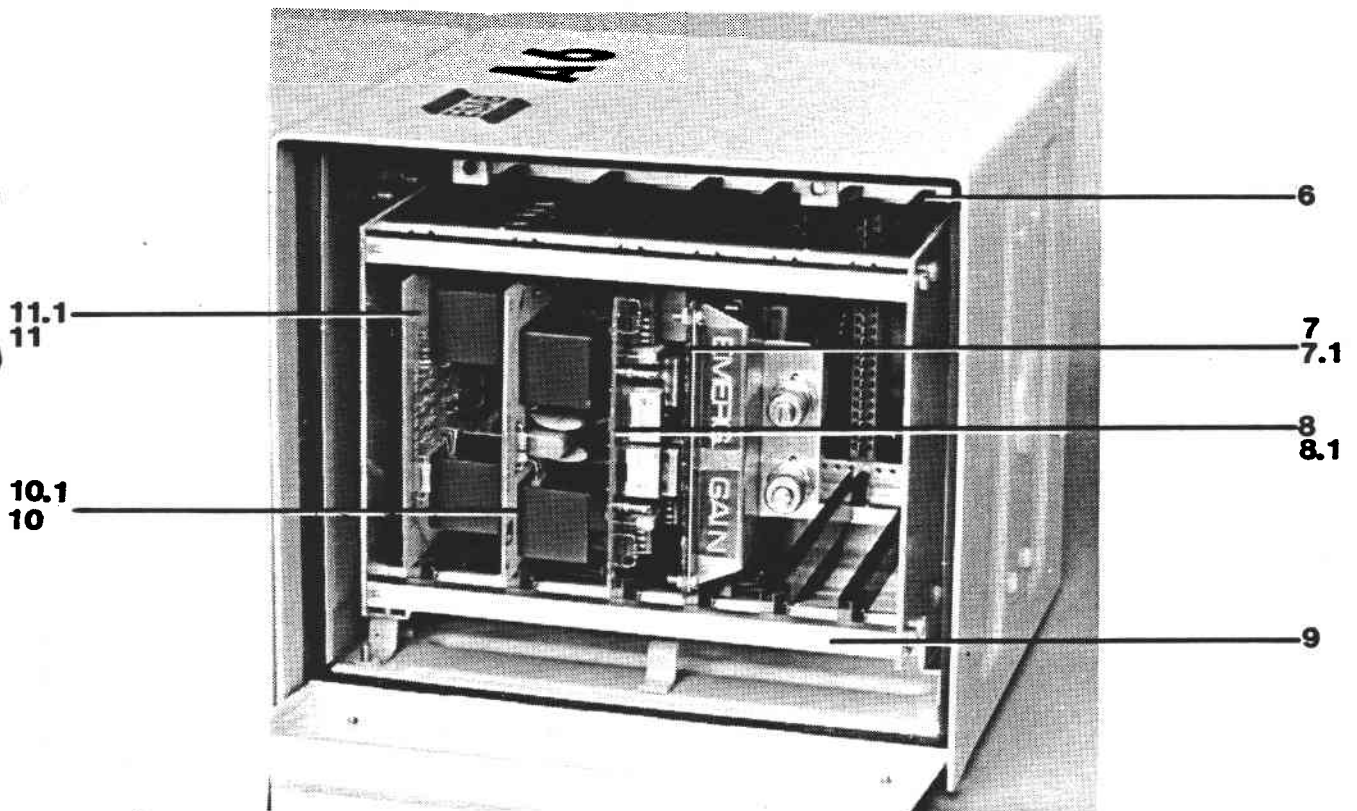
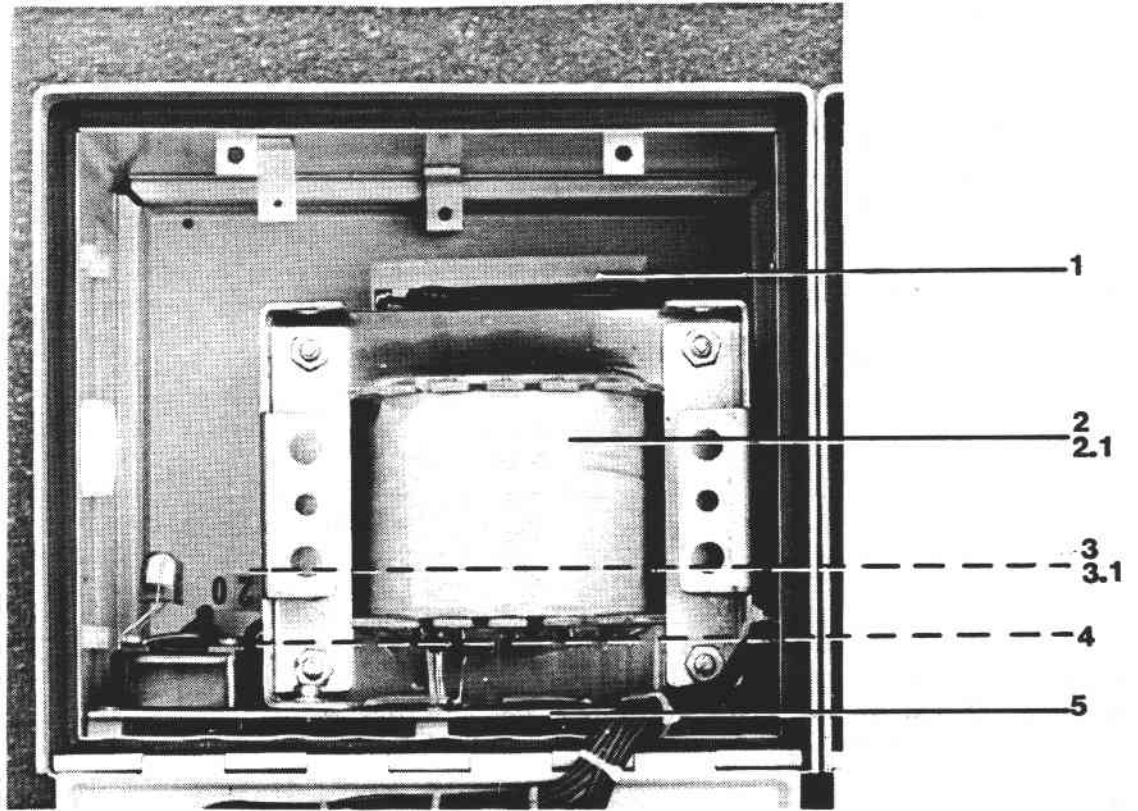
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1	1	155 653-881	PAF 9 I	PAF 9 I	PAF 9 I	PAF 9 I	
2	1	155 662-882	PAF 9 II	PAF 9 II	PAF 9 II	PAF 9 II	
3	1	156 437-880	Hållare	Holder	Halterung	Support	
4	1	145 131-001	Isolerhylsa	Insulating sleeve	Isolierhülse	Douille isolante	
5	1	156 104-880	Servostyrdon	Servo control unit	Hilfssteuer-einheit	Unité servocommande	
6	1	146 215-883	Kabel	Cable	Leitung	Câble	
6.1	1	193 118-001	Kabel*)	Cable*)	Leitung*)	Câble*)	7x1,5
7	1	5385 012-11	Hylspropp	Sleeve plug	Buchsenstecker	Fiche femelle	
8	1	5385 004-08	Stiftpropp	Pin plug	Stiftstecker	Fiche mâle	
			*) Längd enl. order	*) Length as ordered	*) Länge gem. Bestellung	*) Longueur selon commande	



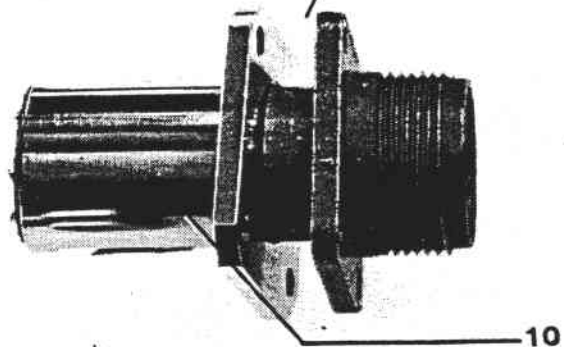
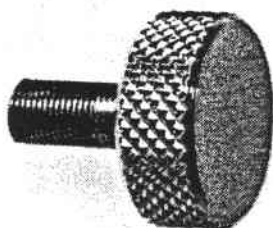
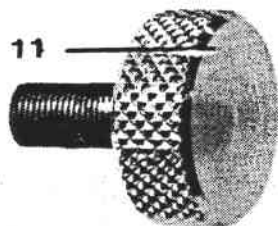
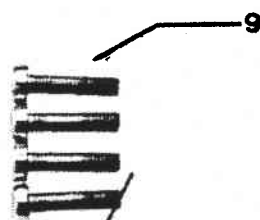
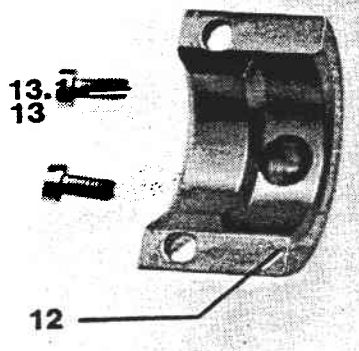
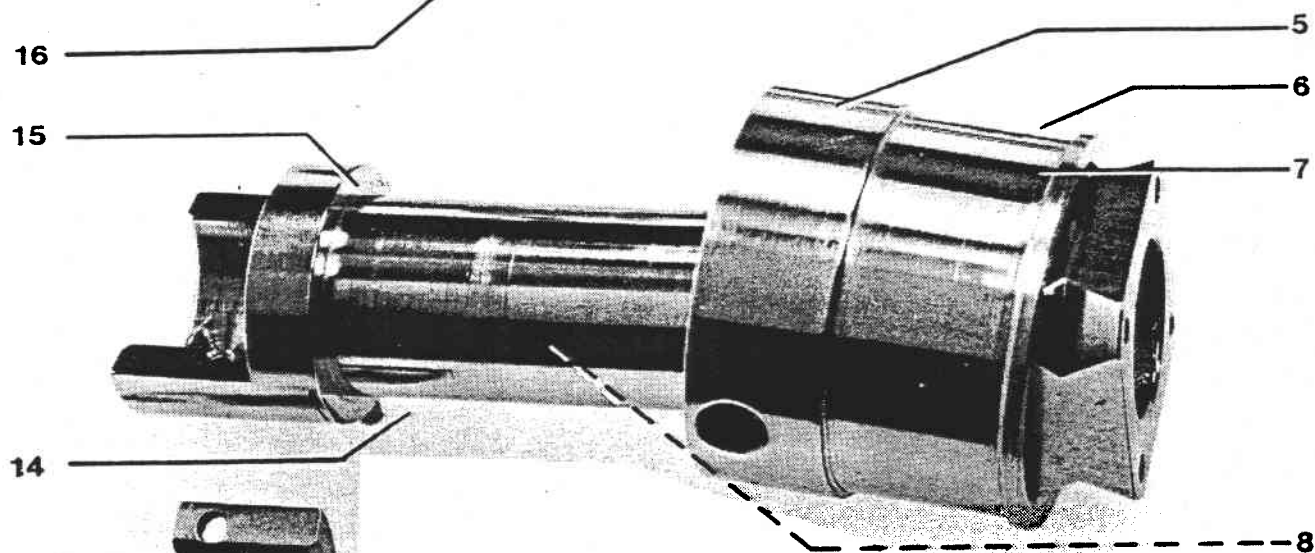
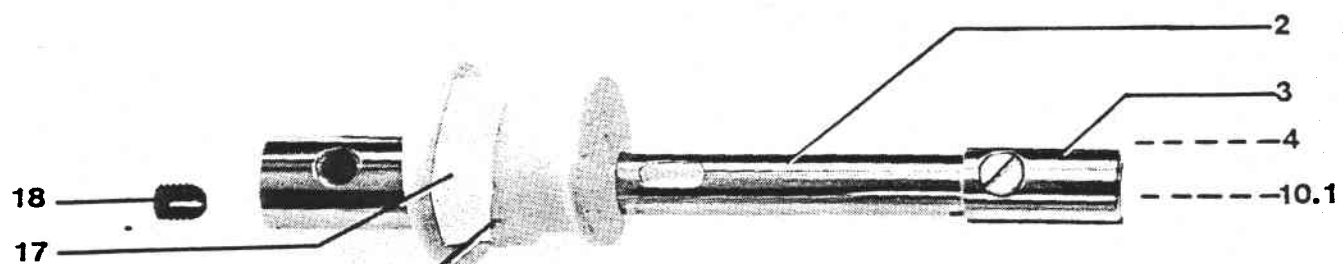
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1	1	155 667-001	Skylt, bakre	Plate, rear	Rückwandblech	Plaque arrière	
2	1	334 445-001	Skylt, bakre	Plate, rear	Rückwandblech	Plaque arrière	
3	1	5385 000-08	Hylsuttag	Sleeve socket	Buchsensteckdose	Prise femelle	AI 16
4	2	5677 006-01	Finsäkrings- hållare	Quick-blow fuse holder	Feinsicherungs- halter	Porte-fusible rapide	(AI 20)
4.1	2	5679 001-16	Finsäkring	Quick-blow fuse	Feinsicherung	Fusible rapide	AI 20
5	1	5376 023-03	Elkopplare	Switch	Schalter	Interrupateur	AI 19
6	2	5385 001-06	Hylsuttag	Sleeve socket	Buchsensteckdose	Prise femelle	AI 17, AI 18
7	1	2126 022-01	Kontramutter	Locking nut	Kontermutter	Contre-écrou	
8	1	191 011-102	Elkopplare	Switch	Schalter	Interrupateur	AI 15
8.1	1	191 005-104	Vred	Knob	Knebel	Bouton	
9	1	0409 395-03	Elkopplare (manipulator)	Switch (positioner)	Schalter (Posi- tioniertvorricht.)	Interrupateur (positionneur)	AI 11
10	1	192 722-258	Elkopplare	Switch	Schalter	Interrupateur	AI 14
10.1	1	191 510-104	Ratt	Knob	Drehknopf	Bouton	
11	3	191 264-101	List *)	Sealing strip *)	Gummifassung *)	Bande d'étanchéité *)	
12	2	147 087-001	Skyddsplugg	Plug	Pfropfen	Bouchon	
13	1	153 657-001	Skylt, främre	Plate, front	Frontplatte	Plaque frontale	
14	8	147 087-002	Skyddsplugg	Plug	Pfropfen	Bouchon	
15	1	191 630-101	Lamphållare	Lamp holder	Lampenhalter	Support de lampe	(AI 12)
15.1	1	5911 012-20	Glödlampa	Bulb	Glühlampe	Ampoule	AI 12
15.2	1	191 631-102	Kalott	Cap	Glaskappe	Calotte	(AI 12)
16	1	191 633-101	Tryckknapp	Push-button	Drucktaste	Bouton-poussoir	AI 13
16.1	1	191 682-102	Kontaktblock	Switch mechanism	Kontaktelement	Bloc de contact	(AI 13)
17	1	155 666-001	Skylt, främre	Plate front	Frontplatte	Plaque frontale	
			*) Längd enl order	*) Lenght as ordered	*) Länge gem. Bestellung	*) Longueur selon commande	



Pos nr Item no. Pos. Nr. No. de réf.	Ant Qty. Anz. Qté	Best nr Ordering no. Bestellnr. No. de commande	Benämning	Denomination	Bezeichnung	Désignation	Anm Remarks Anm. Remarque
1	1	0410 516-06	Störskydd	Interference suppressor	Störschutz	Suppresseur	AI 25
2	1	392 790-001	Transformator	Transformer	Trafo	Transformateur	AI 23
2.1	1	5231 041-01	Plint	Connection block	Klemmleiste	Plaque à bornes	AI 26
3	1	193 329-071	Kondensator	Capacitor	Kondensator	Condensateur	AI 27
3.1	1	5231 041-01	Plint	Connection block	Klemmleiste	Plaque à bornes	AI 28
4	1	193 316-006	Likriktare	Rectifier	Gleichrichter	Redresseur	AI 24
5	1	155 659-001	Fästplatta	Mounting plate	Montageblech	Plaque de montage	
6	12	192 292-101	Gejd	Guide	Führung	Guide	
7	1	341 246-882	Kretskort	PCB	Leiterplatte	Circuit imprimé	AI 4
			(Förförstärkare)	(Pre-amplifier)	(Vorverstärker)	(préamplificateur)	
7.1	1	192 564-105	Kontaktdon	Connector	Stecker	Connecteur	(AI 4)
8	1	155 594-881	Kretskort	PCB	Leiterplatte	Circuit imprimé	AI 3
			(Förförstärkare)	(Amplifier)	(Verstärker)	(amplificateur)	
8.1	1	192 564-105	Kontaktdon	Connector	Stecker	Connecteur	(AI 3)
9	2	190 529-102	Tättningslist	Sealing strip	Dichtung	Garniture	
10	1	155 601-880	Kretskort	PCB (Thyristor regulator)	Leiterplatte (Thyristor- Regler)	d'étanchéité Circuit imprimé (régulateur thyristorisé)	AI 2
10.1	1	192 564-105	Kontaktdon	Connector	Stecker	Connecteur	(AI 2)
11	1	155 613-880	Kretskort	PCB (Supply unit)	Leiterplatte (Versorgungs- einheit)	Circuit imprimé (unité d'alimentation)	AI 1
			(Matarenhet)				
11.1	1	191 914-105	Kontaktdon	Connector	Stecker	Connecteur	(AI 1)



Pos nr Item no. Pos. Nr. No. de réf.	Ant Qty. Anz. Qté	Best nr Ordering no. Bestellnr. No. de commande	Benämning	Denomination	Bezeichnung	Désignation	Anm Remarks Ann. Remarque
1	2	146 586-001	Styrfinger	Guide finger	Tastfinger	Doigt de guidage	65x75 mm
2	1	156 113-001	Styrarm	Guide arm	Arm	Bras de guidage	
3	1	157 183-001	Hylsa	Sleeve	Hülse	Douille	
4	1	332 274-001	Diffusor	Diffusor	Diffusor	Diffuseur	
5	1	156 109-001	Fjäderhylsa	Spring sleeve	Federhülse	Douille-ressort	
6	1	156 112-001	Fjäder	Spring	Feder	Ressort	
7	1	2111 010-45	Pinne cyl.	Cyl. roller	Passtift	Cheville cylindr.	
8	1	190 191-125	Isolering	Insulation	Isolation	Isolation	
9	1	2121 080-29	Skruv cyl.stål	Screw	Schraube	Vis	
10	1	156 106-880	Givarenhet (inkl. lysdiod)	Transducer (incl. LED)	Messwertgeber (einschl. LED)	Transducteur (diode lumines- cente incluse)	
10.1	1	192 939-002	Lysdiod	LED	Leuchtdiode	Diode luminescente	
11	2	156 110-001	Ratt	Knob	Knebel	Bouton	
12	1	156 114-001	Överfall	Clamp	Bügel	Crampon	
13	2	2121 080-27	Skruv cyl.stål	Screw	Schraube	Vis	
13.1	6	2151 000-46	Bricka	Washer	Scheibe	Rondelle	
14	1	2111 010-46	Pinne cyl.	Cyl. roller	Passtift	Cheville cylindr.	
15	1	156 108-001	Hylsa	Sleeve	Hülse	Douille	
16	1	2213 070-06	Stålkula	Steel ball	Stahlkugel	Bille d'acier	
17	1	156 111-001	Gummibussning	Rubber bushing	Gummibuchse	Douille en caoutchouc	
18	2	2122 045-45	Stoppskruv	Grub screw	Anschlagschraube	Vis d'arrêt	



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Group H.Q. International directory of subsidiary and associated companies.
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